

WHAT IS CLAIMED IS:

1. An internal combustion engine in which it is possible to set a period during which both an intake valve and an exhaust valve are closed from an exhaust stroke to an intake stroke,

wherein the engine includes a fuel injection valve capable of injecting fuel into the combustion chamber, a time for closing the exhaust valve is set to be at a timing on an advance side with respect to an intake top dead center, and the fuel injected from the fuel injection valve is pressurized together with a residual gas inside the combustion chamber during a period in which both the intake valve and the exhaust valve remain closed.

2. An internal combustion engine according to Claim 1, wherein a timing with which the fuel is injected from the fuel injection valve into the combustion chamber is immediately before the time for closing the exhaust valve.

3. An internal combustion engine according to Claim 1, wherein a timing with which the fuel is injected from the fuel injection valve into the combustion chamber is immediately after the time for closing the exhaust valve.

4. An internal combustion engine according to Claim 1, wherein the internal combustion engine is a premixed compression ignition engine in which an air fuel mixture prepared by previously mixing fuel with air is sucked into the combustion chamber.

5. An internal combustion engine according to Claim 1, wherein

air mixed with no fuel is sucked into the combustion chamber, and wherein fuel for main combustion is also injected from the fuel injection valve.

6. An internal combustion engine according to Claim 1, wherein one of an amount of the fuel injected from the fuel injection valve and a timing with which the fuel is injected into the combustion chamber can be varied, and wherein the period during which both the intake valve and the exhaust valve remain closed is fixed.

7. An internal combustion engine according to Claim 1, wherein a time for opening the intake valve is set to be around the intake top dead center.

8. An internal combustion engine control device comprising:  
a variable valve timing mechanism capable of varying opening/closing timing for an intake valve and an exhaust valve;  
an intake/exhaust valve opening/closing timing control means for setting a time for closing the exhaust valve to be at a timing on an advance side with respect to an intake top dead center of a piston, and for controlling the variable valve timing mechanism such that there exists from an exhaust stroke to an intake stroke a period during which both the intake valve and the exhaust valve remain closed; and

a fuel injection valve capable of injecting fuel into a combustion chamber such that the injected fuel is pressurized together with a residual gas inside the combustion chamber during

the period in which both the intake valve and the exhaust valve remain closed.

9. An internal combustion engine control device according to Claim 8, wherein the fuel injection valve injects fuel into the combustion chamber at a timing immediately before the time for closing the exhaust valve.

10. An internal combustion engine control device according to Claim 8, wherein the fuel injection valve injects fuel into the combustion chamber at a timing immediately after the time for closing the exhaust valve.

11. An internal combustion engine control device according to Claim 8, wherein the intake/exhaust valve opening/closing timing control means controls the variable valve timing mechanism such that a time for opening the intake valve is set around the intake top dead center.

12. An internal combustion engine control method that uses a internal combustion engine control device, the device comprising: a variable valve timing mechanism capable of varying opening/closing timing for an intake valve and an exhaust valve; an intake/exhaust valve opening/closing timing control means; and a fuel injection valve,

wherein the intake/exhaust valve opening/closing timing control means sets a time for closing the exhaust valve to be at a timing on an advance side with respect to an intake top dead center

of a piston, and for controlling the variable valve timing mechanism such that there exists from an exhaust stroke to an intake stroke a period during which both the intake valve and the exhaust valve remain closed, and

the fuel injection valve injects fuel into a combustion chamber such that the injected fuel is pressurized together with a residual gas inside the combustion chamber during the period in which both the intake valve and the exhaust valve remain closed.